AMENDMENTS TO THE CLAIMS

Amendments to the Claims

Claims 1-9 and 18-20 and 26 are provisionally withdrawn with traverse. Claims 10-17, 21-25 and 27-33 are elected. Claims 21, 27, 28, 33 are cancelled and Claims 34, 35, 36, 37, 38, 39, 40 were previously added, and Claims 41 – 44 are added herein. Therefore the number of Claims is increased by 3 dependent claims in this Amendment.

Claims 1-9 are provisionally withdrawn:

1. [Withdrawn] A composition comprising a first compound including immobilized metal atoms and/or ions capable of binding compounds containing a non-shielded purine or pyrimidine group and a second compound containing a non-shielded purine or pyrimidine group bound to a portion of the metal atoms and/or ions.

2. [Withdrawn] The composition of claim 1, wherein the second compound is selected from the group of RNA, single stranded DNA, and other molecules having a non-shielded purine and/or pyrimidine moiety or group.

3. [Withdrawn] An immobilized metal affinity chromatography (IMAC) column comprising a packing including immobilized metal atoms and/or ions capable of binding compounds containing a non-shielded purine or pyrimidine moiety or group and a compound containing a non-shielded purine or pyrimidine moiety or group bound to a portion of the metal atoms and/or ions.

4. [Withdrawn] A substrate comprising a plurality of ligands bonded thereto, each ligand immobilizing a metal atom and/or ion capable of binding compounds containing a non-shielded purine or pyrimidine moiety or group, and a compound containing a non-shielded purine or pyrimidine moiety or group bound to a portion of the metal atoms and/or ions.

5. [Withdrawn] The substrate of claim 4, wherein the second compound is selected from the group of RNA, single stranded DNA, and other molecules having a non-shielded purine and/or pyrimidine moiety or group.

6. [Withdrawn] An apparatus comprising a sample input unit, a separation unit, a detector unit and an analyzer unit.

7. [Withdrawn] The apparatus of claim 6, wherein the separation unit is a zone comprising an IMAC matrix including metal atoms, metal ions or mixtures thereof capable of binding compound having a non-shielded purine moiety, pyrimidine moiety or mixture thereof.

8. [Withdrawn] An apparatus comprising a substrate having an IMAC ligand coated thereon, bonded thereto, deposited thereon or deposited therein, where the substrate is adapted to remove contaminating compounds including a non-shielded purine moiety, pyrimidine moiety, or mixture thereof from target compounds including a shielded purine moiety, pyrimidine moiety, or mixture thereof.

9. [Withdrawn] The apparatus of claim 8, wherein the substrate is selected from the group consisting of a porous stirrer, a filter, a membrane, an interior wall of a vessel, or mixtures thereof.

Original Claims 10-17 are elected:

10. [Currently Amended] A method for separating compounds comprising the step of:

contacting a ~~solution~~ mixture comprising cell lysate or enzyme and a DNA and/or RNA target compound ~~including DNA and/or or RNA,~~ which ~~comprise~~ includes at least four ~~a~~ non-shielded purine or pyrimidine moieties ~~moiety~~, and other compounds, ~~including a shielded purine or pyrimidine moiety~~ with a solid composition including immobilized metal

~~atoms and/or~~ ions capable of binding compounds containing a non-shielded purine or pyrimidine moiety, to form a ~~supernatant~~ liquid product containing ~~having~~ a reduced amount of ~~compounds~~ the DNA or RNA compound which includes at least four ~~including a~~ non-shielded purine or pyrimidine moieties ~~moiety~~; and collecting the target compound.

11. [Original] The method of claim 10, further comprising the step of: separating the supernatant liquid from the solid composition.

12. [Currently Amended] A method for separating compounds comprising the steps of:

passing a ~~solution comprising a~~ mixture of compounds including target DNA and/or RNA compounds , comprising ~~and a~~ at least four non-shielded purine moieties ~~moiety~~, ~~a~~ at least four non-shielded pyrimidine moieties ~~moiety~~ or mixture thereof through a column including an IMAC ligand, where the ligand is capable of differentially binding the compounds; and

collecting purified samples of the target DNA and/or RNA compounds. ~~each compound~~.

13. [Original] The method of claim 12, further comprising the step of:

detecting each compound in an effluent from the column as a function of time from at least one detectable property associated with each compound; and

determining the identity of each compound from the detected properties.

14. [Currently Amended] A method for purifying soluble or liquid food stuffs containing purine and/or pyrimidine moieties comprising the steps of:

forming a crude food stuff comprising cellular constituents including digestible proteins and nucleic acid contaminants including a non-shielded purine moiety, a non-shielded pyrimidine moiety or mixture thereof;

contacting the food stuff with substrate comprising an IMAC ligand, where the substrate binds the nucleic acid contaminants; and

removing the substrate comprising the IMAC ligand having bound thereto the nucleic acid contaminants to form a purified food stuff.

15. [Original] The method of claim 14, further comprising the step of

treating the crude food stuff with a DNAase, endo or exo nuclease or other nucleic acid digestion enzyme or agent prior to the contacting step.

16. [Currently Amended] A method for purifying a lysate or enzyme product comprising a crude DNA ~~and/or~~ or RNA target compound containing ~~a~~ at least four non-shielded purine and/or pyrimidine ~~moiety~~ base moieties, said method comprising the steps of:

forming a crude mixture comprising a target compound and contaminants;

contacting the crude mixture with an agent including an IMAC ligand capable of binding to the target compound to form an IMAC ligand complex;

separating the complex from the contaminants; and

recovering the target compound from the complex.

Please cancel Claim 17 without prejudice:

17. [Cancelled) The method of claim 16, wherein the compound is an AIDs drug ~~drugs~~ selected from the group consisting of AZT or DDI, ~~co-enzyme A,~~ or mixtures thereof.

Claims 18-20 are provisionally withdrawn:

18. [Withdrawn] An assay comprising the steps of:

contacting a microplate substrate comprising wells coated with a composition comprising a IMAC-oligonucleotide complex including an IMAC ligand and a single stranded oligonucleotide having a first molecular and/or atomic tag bound to the IMAC ligand; and

contacting a nucleic acid sequence including a second molecular and/or atomic tag with the IMAC-oligonucleotide complex; and

measuring a change in fluorescence when the nucleic acid sequence includes a complimentary subsequence to oligonucleotide due to an interaction between the first and second molecular and/or atomic tags.

19. [Withdrawn] The assay of claim 18, wherein the first tag is a fluorophore and the second tag is a quencher for the fluorophore.

20. [Withdrawn] An assay comprising the steps of contacting a substrate comprising a surface coated with a composition comprising an IMAC ligand and a first fluorophore with an oligonucleotide including a second fluorophore and measuring an effective Stoke shift such that a large effective Stoke shift signifies oligonucleotide binding to the coated substrate and a normal effective Stoke shift signifies no oligonucleotide binding to the coated substrate.

21. [Canceled]

22. [Currently Amended] A method according to Claim [21] 35 further comprising the steps of:

separating the supernatant liquid from the solid composition; or further comprising the steps of:

separating the supernatant liquid from the solid composition and

eluting the compounds including a non-shielded purine or pyrimidine moiety from the solid composition.

23. [Currently Amended] A method for separating compounds comprising the step of:

contacting a ~~solution~~ mixture comprising cell lysate or enzyme and a target compound ~~compounds~~ including DNA, RNA, or both DNA and RNA, ~~DNA and/or RNA,~~

a non-shielded purine or pyrimidine moiety and a compound ~~compounds~~ including a shielded purine or pyrimidine moiety with a solid composition including immobilized metal ~~atoms and/or~~ ions capable of binding compounds containing a non-shielded purine or pyrimidine moiety to form a supernatant liquid having a reduced amount of compounds including a non-shielded purine or pyrimidine moiety;

wherein the compound ~~compounds~~ including a non-shielded purine or pyrimidine moiety comprises ~~comprise~~ a single stranded nucleic acid oligomer, or a single stranded nucleic aid polymer and the compounds including a shielded purine or pyrimidine moiety comprise double stranded nucleic acid oligomers or double stranded nucleic acid polymers;

wherein the supernatant liquid comprises compounds including DNA and/or RNA, and ~~a shielded purine or pyrimidine moiety having~~ contains less than or equal to 5% by weight compounds including a non-shielded purine or pyrimidine moiety.

24. [Currently Amended] A method of Claim 22 wherein the supernatant liquid comprises compounds including a shielded purine or pyrimidine

moiety having less than or equal to 1% by weight of compounds which include ~~including~~ a non-shielded purine or pyrimidine moiety.

25. [Currently Amended A method of Claim 22 wherein the supernatant liquid comprises compounds including a shielded purine or pyrimidine moiety having less than or equal to 0.01% by weight compounds which include ~~including~~ a non-shielded purine or pyrimidine moiety.

26. [Withdrawn] A method for making multisubstrate columns comprising the step of running a small amount of IMAC ligand onto an activated column and then flooding the rest of the column with at least one additional ligand or stationary phase.

27. [Cancelled]

28. [Cancelled

29. [Currently Amended] A method of Claim ~~27~~ 23 wherein the mixture ~~of compounds~~ comprises poly(A) tailed mRNA sequences and other mRNA sequences from eukaryotic cells, the poly(a) mRNA sequences elute after the other mRNA sequences; or wherein the mixture ~~for~~ of compounds comprises denatured nucleic acid sequences, wherein ~~where~~ sequences having A- rich regions elute after sequences having T- rich regions; so that complementary strands can be resolved.

30. [Currently Amended] A method of Claim ~~27~~ 23 wherein the solution ~~mixture of compounds~~ comprises denatured nucleic acid sequences, wherein ~~where~~ sequences having C rich regions elute after sequences having G-rich regions so that complementary strands can be resolved;

or wherein the mixture of compounds comprises denatured or partially denatured nucleic acid sequences having A-C, A-G, A-C-G, T-G, T-C and or T-G-C rich regions wherein ~~so that~~ the sequences having the ~~thee~~ A-C, A-G, and/or A-C-G rich regions elute after their complementary sequences having T-G, T-C and or T-G-C rich regions resulting in a resolution of complementary sequences.

31 . [Currently Amended] A method for purifying food stuffs containing purine and/or pyrimidine moieties comprising the steps of:

forming a crude liquid food stuff comprising cellular constituents including digestable proteins and nucleic acid contaminants including a non-shielded purine moiety, a non-shielded pyrimidine moiety or mixture thereof;

contacting the food stuff with substrate comprising an IMAC ligand, where the substrate binds the nucleic acid contaminants; and

removing the substrate comprising the IMAC ligand having bound thereto the nucleic acid contaminants to form a purified food stuff; and optionally further comprising the step of treating the crude food stuff with a DNAse, endo or exo nuclease or other nucleic acid digestion enzyme or agent prior to the contacting step.

32. [Currently Amended] A method for purifying a crude target compound containing a non-shielded purine and/or pyrimidine moiety from a mixture comprising cell lysate or enzyme and a DNA or RNA compound ~~containing DNA and/or RNA~~, which comprise compounds with ~~and without~~ a at least four non-shielded purine and/or pyrimidine moieties ~~moiety~~, comprising the steps of:

forming a crude mixture comprising a target compound and contaminants;

contacting the crude mixture with an agent including an IMAC ligand capable of binding to the target compound to form an IMAC ligand complex;

separating the complex from the contaminants; and

recovering the target compound from the complex.

33. [Cancelled]

34. [Currently Amended] The method of claim 10 wherein the ~~molecule~~ target compound containing ~~a~~ at least four non-shielded purine or pyrimidine moieties, ~~moiety~~ is selected from the group consisting of ~~among~~ single-stranded DNA, partially single-stranded DNA, denatured DNA, fragmented DNA or RNA, plasmid DNA containing single-stranded regions, incomplete or imperfect PCR products, chain-terminated polymerase products, restriction endonuclease-digested DNA, single-stranded PNA, single-stranded primer, single stranded RNA, polyA mRNA and ~~and/or~~ messenger RNA, and is removed from compounds that do not contain a non-shielded purine or pyrimidine moiety.~~or group such as genomic DNA, double-stranded plasmid DNA, double-stranded PCR product, double-stranded hybrid, or double-stranded PNA.~~

35. [Currently Amended] A method for separating compounds comprising the step of:

contacting a ~~solution~~ mixture comprising cell lysate or enzyme

comprising double-stranded DNA and additionally comprising RNA and/or DNA, ~~the RNA and/or DNA containing~~ which contains single-stranded portions having a non-shielded purine or pyrimidine moiety, with a solid composition ~~including~~ comprising immobilized metal ions capable of binding compounds having a non-shielded purine or pyrimidine moiety, to form a supernatant liquid having a reduced amount of RNA and/or DNA having single-stranded portions.

36. [Currently Amended] A method for separating compounds comprising the steps of:

passing a solution ~~comprising~~ comprising

at least one RNA ~~and/or~~ or DNA compound, the RNA ~~and/or~~ or DNA compound containing single-stranded portions having at least four ~~a~~ non-shielded purine or pyrimidine ~~moiety~~ moieties through a column including an IMAC ligand,

where the ligand is capable of differentially binding the DNA and/or RNA compounds;

and collecting purified samples of each DNA and/or RNA compound.

37. [Previously Presented] The method of claim 36, further comprising the step of:

detecting each compound in an effluent from the column as a function of time from at least one detectable property associated with each compound; and

determining the identity of each compound from the detected properties.

Please cancel Claim 38 to avoid duplication.

37. The method of claim 36, further comprising the step of:

detecting each compound in an effluent from the column as a function of time from at least one detectable property associated with each compound; and

determining the identity of each compound from the detected properties.

38. Cancelled

Add Claims 39 - 44 to replace cancelled Claims 17 and 38.

39. [New] A method according to Claim 34 wherein the target compound is separated from a compound selected from the group consisting of genomic DNA, double-stranded plasmid DNA, double-stranded PCR product, double-stranded hybrid and double-stranded PNA.

40. [New] The method of claim 36, further comprising the step of:

detecting each compound in an effluent from the column as a function of time from at least one detectable property associated with each compound.

41.[New] The method of Claim 32 wherein the contacting of the crude mixture with the agent including an IMAC ligand capable of binding to the target compound to form an IMAC ligand complex in performed in batch mode.

42. [New] The method of Claim 32 wherein the target compound comprises RNA having at least four non-shielded purine and/or pyrimidine moieties and is separated from a lysate containing double-stranded DNA.

43. [New] The method of Claim 32 wherein the target compound recovered from the complex is present in the original mixture at a concentration of less than 1 micromolar.

44. [New] The method of Claim 32 wherein the contacting of the crude mixture with the agent including an IMAC ligand capable of binding to the target compound to form an IMAC ligand complex in performed in batch mode, and the target compound recovered from the complex is present in the original mixture at a concentration of less than 1 micromolar.